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ABSTRACT

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Assessing the Impact of Reading Interventions: Indiana's Early Literacy Intervention Grant Program

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Abstract

This paper develops and tests a new logical model for assessing the impact of early reading interventions. The analyses use a survey of Indiana's elementary schools, including schools funded for Reading Recovery and classwide interventions, as well as a group of control schools. The findings indicate that state-funded Reading Recovery was associated with fewer referrals for special educational after the influences of general classroom practices were controlled for in a regression analysis. Further, classwide early reading interventions were associated with lower rates of retention in grade level. In addition, these outcomes—the rates for retention and special education referral—were also influenced by program features related to family involvement and instructional practices.

Assessing the Impact of Reading Interventions: Indiana's Early Literacy Intervention Grant Program

Introduction

In 1998 the National Research Council published a report that reviewed the research on early reading. It argued that a balanced approach to early reading was needed that included an emphasis on early phonemic awareness within a systematic approach to reading (Snow, Burns, & Griffin, 1998). Now, with the passage of the *Reading Excellence Act*[1], more states will have the opportunity to develop new programs that promote research-based interventions. This wave of reform presents a new challenge for state officials and educational researchers because it also includes a focus on the systematic evaluation of interventions. This prospect, that states might need to provide objective information that assesses the impact of reading interventions, raises some important questions about how different types of reading interventions can be compared and assessed. Unfortunately, there are few models for assessing the effects of different types of interventions on student outcomes.

This paper develops and tests a new logical model for assessing the impact of early reading and literacy interventions on student outcomes. We present an assessment of the impact of Indiana's Early Literacy Intervention Grant Program (ELIGP). Approximately half of the ELIGP funds supported professional development for Reading Recovery, a nationally recognized pullout program, while the rest provided resources and professional development opportunities for other early reading interventions (e.g., Four Blocks, First Steps, Success for All). Many of the programs funded, including Reading Recovery, have been reported to promote reading achievement as well as reduce special education referral and grade retention (e.g., Lyons, 1994; Lyons & Beaver, 1995).

This study focuses on the influence of early reading interventions on special education referral and retention in grade level, two opportunity-related outcomes. Achievement test scores were not used in this initial test of the new logical model. The

[1] Passed by the 106th Congress in 1999, the *Reading Excellence Act* (H.R. 1995) amended *the Elementary and Secondary Education Act of 1965*, as previously amended.

scope of the grant program, which served about 10,000 students, made student testing for this study impractical. In addition, state reading tests, given in the fall of 3rd grade, would not be available for many students in this study for two more years. However, the logical model developed for this study could be used to assess the impact of reading interventions on achievement tests. In the following sections, we first provide background for the study, then consider methods, findings, and conclusions.

Background

The State Interest in Evaluation of Reading Interventions

Even before the federal government passed the *Reading Excellence Act*, a few states had initiated efforts to promote improvement in early reading. In particular, several states had experimented with large-scale investments in Reading Recovery, using this as a preferred approach to improving early reading for students who are having trouble learning to read (e.g., Pinnell, Lyons, DeFord, Byrk, & Seltzer, 1994). Although the National Research Council review (Snow, et al., 1998) recognized that Reading Recovery has some strong features, including its systematic approach and its focus on professional development, it concluded that Reading Recovery has not had its intended impact.

A number of reforms take either a classroom-wide approach to reading improvement (e.g., Cunningham, 1991; Cunningham, Hall, & Defee, 1991) or a schoolwide approach to reform (e.g., Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). Of these methods, Success For All was identified by the National Reading Council (Snow, et al., 1998) as having a sound design and a sound confirmatory research base (e.g., Slavin, et al., 1994; Slavin, Madden, Karweit, Dolan, & Wasik, 1990). It is conceivable that states could promote reading reforms that have a research base, or that are compatible with the findings of the National Research Council's report. However, whether states are interested in programs that adopt existing reform methods, adapt features from these reforms, or develop methods that encourage innovation based on an understanding of the research base, there are challenges that complicate efforts to evaluate the impact of these programs within the context of state policy.

First, there is little agreement on the outcomes of reading or how they should be measured in the state policy context. The issue of choice of instrument is complicated by

the fact that different types of reading interventions aim to influence different aspects of reading acquisition. For example, literature-rich approaches focus on outcomes related to understanding, such as emergent literacy and critical thinking (Flint, 1999; Tuman, 1987; Wilson, 1986), but do not place as much emphasis on decoding per se. The research on Success For All used a specific set of tests (i.e., Woodcock Word Recognition) that were reasonably well aligned with the new curriculum they introduced, and therefore it is not surprising that the early studies found the interventions had an impact (e.g., Ross & Smith, 1994; Slavin & Yampolsky, 1991). Given its focus on decoding and phonemic awareness, the National Reading Council study did not fully address these divergent notions of reading. Even the National Reading Council acknowledged that researchers used a variety of assessment instruments (Snow, et al., 1998), which complicated the comparison of different types of interventions. Nevertheless, it is important that literacy interventions be assessed in relation to outcomes that states consider important.

Two types of outcomes are important to consider when assessing the impact of reading interventions for states (St. John, Ward, & Laine, 1999). In particular, state policymakers have become concerned about early achievement on high stakes tests. Not only have most states implemented testing programs that measure early reading performance, but most pay attention to the comparisons provided by the National Assessment of Educational Progress (vis. U.S. Department of Education, NCES, 1994), which rank states on reading achievement. Thus, scores on state reading achievement tests provide one possible measure of outcomes. However, there are also economic and social reasons to be concerned about increasing the percentage of children who learn to read by the end of third grade. Students who do not learn to read in early primary grades are more frequently retained in grade level and/or are referred to special education for assessment and service. Students who are retained or referred to special education not only raise the cost of education per student, given the high costs associated with these outcomes, but they are also more likely to drop out of school (Lyons, 1994; Snow, et al., 1998). Thus, these opportunity-related measures (i.e., special education referral and grade level retention) are also important from a state perspective.

A second challenge stems from the fact that reading reforms have different designs emphasizing various types of intervention strategies and focusing on a vast array

of outcomes. For example, not only does Reading Recovery emphasize pullout as a feature, but Success for All also includes a pullout feature even though it takes a schoolwide approach for the majority of studies. The instructional processes for pullout students and regular classroom students are closely aligned in Success for All, but are not directly related to each other in Reading Recovery. Some interventions place more emphasis on literacy books and parent involvement in reading with children, while others place more emphasis on systematic and formative evaluation. If states are to evaluate the impact of multiple reforms at the same time, it is also important to measure which features have been implemented, as well as the impact these implemented features have on student outcomes. Therefore, it is important to have a fair method of comparing reforms that discerns the important features of those reforms and assesses whether they have been implemented.

Third, schools implement interventions in settings that already have functioning reading programs with features that could be either compatible or incongruent with the specific interventions that schools select. Indeed, the values and beliefs of teachers not only influence the ways they view different reforms but also influence their daily practice. In part to control for these forces, the reformers themselves often encourage schools to consider this issue. For instance, Success For All (Slavin, 1996) and Accelerated Schools (Hopfenberg, Levin, & Associates, 1993) encourage a schoolwide "buy in." The Comprehensive School Reform Demonstration Program[2] (CSRD) regulation actually requires a buy-in process as well. This buy-in process by educators in schools provides a mechanism that teachers can use to make judgements about how well the reforms relate to their needs and practice. Thus, it is important that evaluation methods consider the values and beliefs that are currently in use in schools, if not the actual features of early reading programs already in place in schools.

Indiana's Early Literacy Intervention Grant Program

The State of Indiana implemented the Early Literacy Intervention Grant Program (ELIGP) in 1997, a year before passage of the *Reading Excellence Act*. Purdue University had implemented a Reading Recovery program a few years earlier, and the

[2] The Comprehensive School Reform Demonstration Program was established in Fiscal Year 1998 Appropriations Act for the U.S. Department of Education Public Law 105-78.

community of educators who had received some training through this program was influential in lobbying for the program. This lobbying effort was closely aligned with the efforts of the Superintendent of Public Instruction to promote literacy. Her program called for improvements in early literacy and reading, focusing on expanding Reading Recovery, supporting purchase of library books by schools, and expanding state efforts in adult literacy. ELIGP and the other programs were passed and funded by the legislature.

When the proposals for state support for early reading and literacy were reviewed by the legislature, proponents of the Reading Recovery program were active lobbyists. However, there was also interest expressed by some schools in taking other approaches. Even some schools with Reading Recovery programs were interested in implementing schoolwide approaches that complemented this program. Further, an underlying concern in the legislature about balancing support between the universities in the state also influenced their decision to take an approach that would support diverse intervention methods. Thus, while lobbying by universities other than Purdue was modest, the legislature decided that Reading Recovery as well as other types of reading and early literacy interventions should be funded.

During the first year of the program, which we assess in this study, the ELIGP funded projects in 70 school corporations (school districts), reaching an estimated 9,685 students (Table 1). About half of the funding was directed toward training Reading Recovery teachers and trainers for the program. An estimated 1,855 students received services from teachers in training. These services supplemented Reading Recovery programs that were already in place in many of the schools. Other early literacy intervention (OELI) projects were funded in 54 corporations and reached an estimated 7,830 students. Examples of OELI projects funded included Four Blocks Method (Cunningham, 1991), Literacy Collaborative (Ohio State University, 1998), and Success for All (Slavin, 1996) as well as many other locally developed interventions.

TABLE 1

Grant Amounts and Number of Projects

PROGRAM TYPE	AMOUNT STATE $[2]	CORPORATIONS WITH	SCHOOLS WITH	ESTIMATED STUDENTS[4]
Reading Recovery® trainers[1]	596,482	10	NA	NA
Reading Recovery®	$1,104,000	70	140	1855[3]
Other (includes LC and FDK[5])	1,662,335	54	142	7830
Totals	2,766,335	107	262	9685

Notes:
[1] The $596,482 for the training of ten new Reading Recovery® trainers (teacher leaders) was allocated directly to Purdue University, rather than to the school corporations.
[2] The state funding is derived from information provided with the approved applications, rather than from surveys.
[3] The number of Reading Recovery® teachers trained this year was 184. Reading Recovery® teachers in training do not serve as many students as do fully trained teachers (at 8 students/year, 184 fully trained teachers serve about 1,472 students). A teacher in training might serve half that number of students (736). To be generous, we assumed 6 students per teacher, which yields 1,104. One question on the survey asks respondents to indicate the expected number of students served. The sum for the 50 Reading Recovery® surveys is 1,501 students served by 125 teachers, or 12 students reported served by Reading Recovery® teachers. This is twice the number of students usually said to be served by a teacher while in the training year.
[4] The estimated number of students is derived from estimates provided in the survey responses for corporations that completed surveys and from the estimates in the applications for corporations that did not return the surveys.
[5] FDK = Full-Day Kindergarten.

Source: Early Literacy Intervention Grant Program Survey, 1998. See Appendix D.

A couple of issues complicated the first-year evaluation of the project, which was initiated after the funds had been disbursed. First, the fact the funds went to school corporations rather than directly to schools complicated the selection of outcome measures. A necessary first step before assessing impact was to examine the types of projects implemented and where they were implemented. Further, given that the ELIGP was implemented before the evaluation study was designed, it was not possible to select a set of generally accepted tests to assess reading outcomes beforehand, to establish baselines (or pre-test) information. Finally, state test scores were not an appropriate outcome measure, at least for the first year of the study. Most of the students who received services through the program were in kindergarten through second grade, and

thus would not take the third-grade achievement tests until several years later. After a review of the alternatives, it was apparent that opportunity-related outcomes—special education referral rates and rates of retention within grade level—were the most appropriate measures of impact. In addition, since the Reading Recovery literature claimed that the program reduced the costs of education by reducing the number of students retained or needing special services (Lyons, 1994; Lyons & Beaver, 1995), these outcome measures appeared to be especially appropriate.

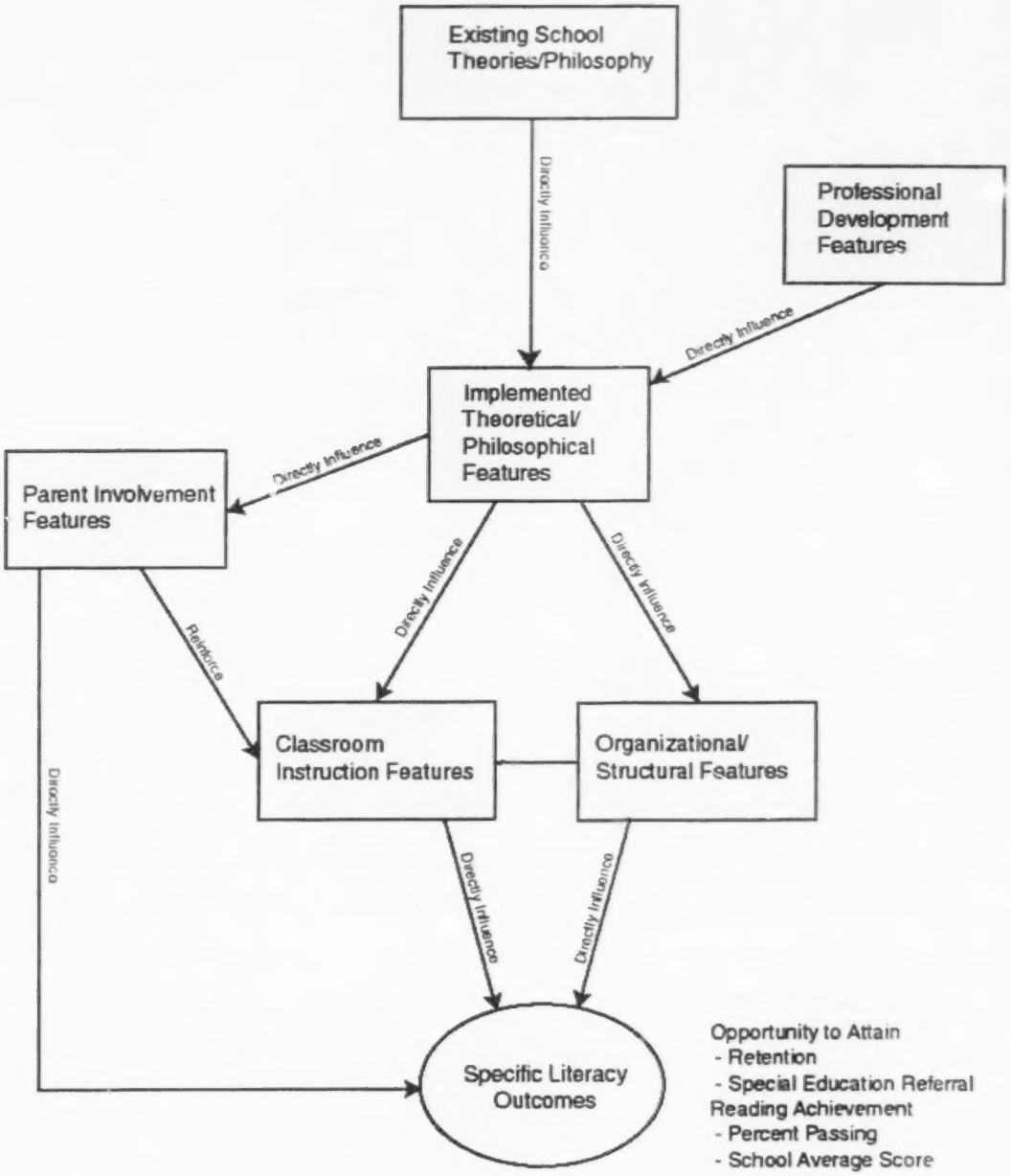
Second, the evaluation design was complicated by the fact that a diverse array of program types had been funded. Since funded projects included diverse classwide methods, including an array of Reading Recovery related interventions, it was necessary to develop a method that assessed the features of reading programs that were put in place in schools, rather than focusing on specific reforms. During the implementation study, the project team focused on the development of a framework that would be useful for identifying features of early reading programs that were actually implemented.

A Framework for Assessing the Impact of Interventions

As a first step in the study we developed a framework for comparing different early reading and literacy interventions that provided a fair basis for comparison. This was necessary for a couple of reasons. First, it was important to identify features of funded programs, discern whether they had been implemented, and assess the extent to which they had changed within a school as a result of funding. Second, it was also important to develop comparative information about possible approaches to reading and literacy improvements that could be communicated by the state to schools during the next year of the grant program.

For this study, an analytic framework for assessing the impact of ELIGP funding on project schools (see Figure 1) was developed after an extensive review of literacy programs. This framework provides a meta-structure for assessing the linkages between the specific features of literacy interventions and specific literacy outcomes. It also provides a tool for evaluating funding impact on program features and outcomes. Six dimensions of program features directly or indirectly influence literacy outcomes: existing school theories and philosophies, professional development features, implemented theoretical/philosophical features, parent involvement features, classroom

Figure 1
Framework for Assessing Early Literacy Interventions



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instruction features, and organizational/structural features. The impact of ELIGP funding is analyzed in terms of its influence on change in literacy program features as well as its impact on indicators of literacy gains such as grade retention and special education referrals.

As a second step, we reviewed the literature on a number of the funded programs to discern their features. This step was necessary to identify the sets of program features that were supposed to be implemented. It was also important in our efforts to assess the features that were already frequently being used in schools. We reviewed the literature on Even Start, Parent-Child Home Program, Full-Day Kindergarten, Reading Recovery, Programmed Tutoring, First Steps, Flour Blocks Method, Literacy Collaborative, Success for All, Accelerated Schools Project, Teacher Inquiry, and Reader's and Writer's Workshops. Specific program features related to each reform were identified, and the research base for each was reviewed (St. John, Bardzell, Michael, Hall, Manoil, Asker, & Clements, 1998).

As a third step, we developed a survey instrument that could be used to examine the features. The Early Literacy Intervention Survey[3] included questions about the types of reading programs that had been implemented, amount of time per day spent on early reading, features of the early reading program, and information related to special education referral and retention. A crucial element of the survey design was the development of a master list of early reading and literacy program features, including definitions and descriptions of the features, which could be used to compare features across programs. In the survey, we included the common features of most programs, as well as features that helped distinguish across programs.

The survey assessed frequency of use by grade level of nine organizational and structural features (ability grouping, basal readers, child-initiated learning centers, independent reading, one-on-one tutorial, pullout instruction, small groups, systematic evaluation, and trade books). For each frequency-of-use question, respondents were asked to provide responses for both the year prior to, and the year of, implementation of the intervention by grade level (K, 1, 2, 3). The survey assessed frequency of use of ten

[3] Copies of the Early Literacy Intervention Survey can be obtained on request from the Indiana Education Policy Center. A simplified version that can be used to survey teachers is available on line (St. John, Manset, & Michael, 1999).

classroom instructional methods (Big Books, cooperative learning, creative writing and/or essays, drama, emergent spelling, paired reading, phonics, reading aloud, reading drills, and worksheets/workbooks). Respondents used a five-point scale ranging from "never" (1) to "everyday" (5). The survey also assessed use of five features related to professional development (certified training, certified specialist, in-service workshops, networking, and opportunity for collaboration) and five features related to parent involvement (book distribution, family literacy, paired reading, parent conference, and parent volunteers) in Kindergarten through grade three. Finally, the survey included questions about enrollment, special education referrals, and retention by grade level. This information was used to calculate the special education referral rate and grade retention rate.

Methods

This section describes the specific research methods used in this report. Below we describe survey administration, the logical model for the regression analyses, statistical methods, and study limitations.

Survey Administration

The Early Literacy Intervention Survey was developed to assess the effects of ELIGP funding both on early literacy outcomes and on changes in program features. Using a new conceptual framework for assessing early literacy interventions, the project team developed a comprehensive assessment instrument. The features in a range of early literacy interventions were identified, based on a detailed reading of the literature. Then, the features were integrated into a survey instrument. An advisory committee provided feedback on drafts of the survey as it was developed and discussed the final draft of the survey with the project team. The survey was pilot tested by elementary principals, whose verbal and written comments were incorporated into the final draft of the survey.

Surveys were administered by mail to both funded schools[4] (261) and a representative sample of comparison schools (351). After two weeks, participants were mailed a postcard reminding them to respond. After three weeks, a second survey was mailed to participants, and non-participants were contacted by telephone. One hundred

[4] Fourteen of the funded schools were not surveyed because they included preschool-only programs that were not appropriate for survey questions or students received instruction at a location other than their school site.

sixty-seven funded schools (64 percent) and 182 comparison schools (52 percent) responded for an overall total of 349 schools (57 percent). Schools were categorized as either Reading Recovery, Other Early Literacy Intervention (OELI), Other Early Literacy Interventions targeting only Kindergarten, such as full day Kindergarten programs (OELI-K) or non-funded, comparison schools. OELI-K schools were not included in this analysis. The relatively few schools that had both Reading Recovery and OELI programs were categorized as OELI. The sampled included all schools funded in 1997-98 and a random sample of schools funded in neither 1997-98 nor 1998-99.[5] One-half of the randomly selected pool of comparison schools was surveyed. In this analysis we weighted the comparison schools (by 2) to control for the probability of being sampled.

The Logical Model

This study tested a new logical model for assessing the effects of various aspects of literacy interventions on improvement in two related outcomes: special education referral and retention in grade level. The logical model assumed that improvement in literacy outcomes was a function of school characteristics (previous reading scores, locale, and student characteristics), type of intervention, professional development features, parent involvement features, and characteristics of early reading programs.

First, we examined school characteristics. The raw scores on the state's third grade reading achievement tests for the year before the intervention (1997) were used as a means of controlling for the influence of student achievement. The percentage of students receiving free or reduced lunch was used as a measure of poverty, and the percentage of minority students (African American, Hispanic, and others) was used as a measure of diversity. To control for the influence of the type of school district, schools in urban and rural locales were compared to students in other (town and suburban) locales.

Second, we considered the direct effects of the receipt of program funding. Schools with funding through the Reading Recovery (RR) and Other Early Literacy Interventions (OELI) were coded as dichotomous variables (no=0, yes=1) in the regression model and compared to unfunded schools. In the regression analysis, the sample was weighted to control for the probability of sampling.

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[5] We needed to keep a comparison group of schools available for the study of schools funded in 1998-99. Therefore, we were careful to select one-half the schools within each corporation (district) type.

Third, the influence of five professional development features frequently included in Reading Recovery and other programs was examined. Variables in this set included whether instructors in the reading program had received training by a certified reading specialist, whether a certified specialist was used in the grade level, whether in-service workshops were provided, whether teachers had the opportunity to network with teachers from other schools, and whether there were opportunities for collaboration within the school. Each was coded as a dichotomous variable (no=0, yes=1).

Fourth, we examined the influence of parent involvement features. Five were examined, whether schools had book distribution, family literacy, paired reading, parent conferences, and parent volunteers. Each was coded dichotomously (no=0, yes=1). Again, each of these program features related to parent involvement was commonly included in literacy interventions.

Fifth, the direct effects of factors related to curriculum and instruction features were examined. From the 19 survey items related to both instructional features and structural/organizational features of the early reading and literacy programs, six factors were identified. The Likert-type response scale used in each of these questions permitted their combination in a principal components analysis. As a fifth step in the sequential regression analysis, the six factors were included in the model to assess the effects of a school's curriculum and improvement on the reading-related outcomes.

By adding these variable sets to an ordinary least squares regression model in a five-step sequence, it is possible to test the logic that professional development affects reading related outcomes by influencing parental involvement or features of early reading programs within schools. Further, by entering type of intervention in a distinct step in the sequence, it is possible to assess whether Reading Recovery or OELI funding had an effect on reading outcomes apart from the professional development process or changes in program features.

Statistical Methods

Two types of statistical methods are used in this initial test of the logical model. We briefly discuss the use of each method below.

Factor Analysis: The 19 instructional features in the ELIGP survey were reduced into six factors using a principal components analysis with varimax rotation. In order to

aid interpretation, a conservative component loading of a minimum of .50 was used. Missing items were replaced with mean values.

Regression Analysis: Ordinary least squares (OLS) regression is a commonly used method for examining the relationship between independent and dependent variables. In this study we stepped five sets of variables into the statistical model to examine their relationship with the two outcome variables, rates of special education referral and grade retention.

In this analysis we present standardized beta coefficients for each independent variable, adjusted R^2 for each step, and three levels of statistical significance: .01, .05, and .1. While the first two are common levels of statistical significance, the latter is a weaker measure of association, but serves here as an indicator of interactions among variables included in different steps of the analysis.

Study Limitations

We recognized and addressed the importance of treating the school as the unit of analysis in this initial test of the model in several ways. First, since this study examined curricula in a large number of schools, we surveyed principals using questions pertaining to the features of early reading programs across grade levels. By limiting the survey to one response per school, we were able to collect the same type of data for a large number of schools. In addition, our outcome variables were school-level measures. However, it could be argued that a survey of teachers, because of the increase in proximity to the variables being examined, would provide a more valid measure of classroom features. In the future it should be possible to adapt the Early Literacy Intervention Survey for an analysis at the classroom level.

Second, while our framework and survey included a focus on the implemented philosophy of the early reading and literacy program in the schools, we did not include these questions in the factor analysis. Since these questions had a different response structure than the Likert-type scale used in questions about instructional and system features, we decided it would be more appropriate, for the sake of consistency, to omit these items from the initial factor analysis. However, future analyses should consider the influence of these variables.

Third, this initial test of the logical model uses OLS regression and factor analysis as means of assessing the impact of the funded interventions on literacy outcomes. However, it might also be desirable in the future to further refine the methods used here. For example, it might be possible to use structural equations that examine direct and indirect effects, or to use logistic regression to examine whether the interventions actually influenced outcomes. However, for an initial test of a new logical model, we decided this method was appropriate.

Fourth, this study does not examine the impact of the intervention on the reading achievement scores on the state-mandated exam. While it may be appropriate to examine the effects of funded school reforms on reading achievement in future studies, it was inappropriate here. Because Reading Recovery targets first grade students only, any program effects would not be apparent in the third-grade reading scores assessed during the fall following the first year of program implementation.

Findings

Factor Analysis

The factor analysis produced a set factor solution (Table 2). The variables loading on each factor are described briefly below.

The first factor, Holistic Approaches, reflects a focus in instruction on whole texts and higher order cognitive skills, such as supporting early writing through emergent spelling activities. Paired Reading (student-to-student) and teachers reading aloud to students are methods that focus on comprehension and fluency. Cooperative learning involves group problem solving and active metacognition, which can be characterized as higher order cognitive skills. Systematic formative evaluation within literacy instruction most often involves some performance task, such as writing for a portfolio or reading a passage for an informal reading inventory. While none of these tasks involve teacher-led instructions in reading, they involve an active performance of a reading or language arts task.

TABLE 2
Loadings for Early Literacy Factors

	Loadings
(1) Holistic Approaches	
Paired Reading (Student-to-Student)	.696
Emergent Spelling	.689
Cooperative Learning	.591
Systematic Formative Evaluation	.525
Reading Aloud	.509
(2) Explicit Approaches	
Basal Readers	.619
Phonics Instruction	.572
Reading Drills	.786
Worksheets/Books	.773
(3) Small Group/Tutorial	
One-to-One Tutoring	.679
Small Group	.661
Trade Books	.533
(4) Child-centered/Expressive	
Child-Initiated Learning Center	.624
Big Books	.645
Drama	.654
(5) Ability Grouping	
Ability Grouping	.746
(6) Pullout Instruction	
Pullout Instruction	.823

The second factor, Explicit Approaches, is composed of those tasks related to decontextualized components of literacy, such as phonemic awareness, grammar, and spelling. These skills require more automaticity than complex problem solving, and focus on context-free methods. The systematic presentation of items and the practice necessary to gain automaticity in these tasks are incorporated in the format of basal readers, worksheets/books, and reading drills. Phonics instruction indicates a focus on the basic sound-symbol associations in reading. Since Basal Readers are included in this factor, and this approach places an emphasis on comprehension, we stop short of characterizing this factor as focusing on lower order skills. Rather, this factor includes variables that

emphasize direct instructional methods and this is appropriately characterized as Explicit Approaches.

The third factor, Small Group/Tutorial, best reflects the two highest loading components, One-to-One Tutoring and Small Group Instruction. Trade Books may load on this factor because they are oftentimes used in the small literacy groups. Classrooms may have a set of trade books for a small group that can be rotated throughout the year rather than one whole class set.

The fourth factor, Child-Centered/Expressive, is comprised of opportunities for students to direct their instruction through learning centers, and oral language expression through the use of drama and reading aloud while using Big Books. Drama allows for an interpretation of text that can deepen comprehension as well as practice communicating orally. Big Books is an activity that involves the use of an oversized "Big Book" (generally picture book) by a teacher, and corresponding small books by students. Beginning readers can read along with the teacher, practice reading aloud, and work with words presented by the teacher.

Factors five and six, Ability Grouping and Pullout Instruction, are single component factors. Ability Grouping reflects the grouping of students into skill levels when they are divided into small groups. Pullout Instruction refers to early literacy interventions that require "pulling out" students from their mainstream classrooms in order to receive instruction.

Population Characteristics

The characteristics of this sample, with weights for sampling probability, are presented in Table 3. First, it should be noted that a very small percentage of either population is referred to special education (5%) or retained in grade level (2%). With these small percentages for the outcome variables, we would expect a relatively low R^2 for the regression analysis.

Second, school characteristics describe the characteristics of schools in the state. The average test score was 34.8 with a small standard deviation. The average percentage of students receiving free or reduced lunch was 25%. More rural (32.9%) than urban schools (13%) were included in the sample.

TABLE 3
Descriptive Statistics of the Sample

	Mean (%)[6]	S.D.
Outcome Variables		
Special education grade 1-3	.05	.03
Grade retention grade 1-3	.02	.02
School Characteristics		
ISTEP Reading Raw Score97	34.84	2.16
% Free or Reduced Lunch	.25	.17
% Minority	.13	.21
Urban[7]	12.9%	
Rural[7]	32.9%	
Funding Type		
OELI[8]	10.3%	
RR[8]	17.7%	
Professional Development		
Certified Training	25.4%	
Certified Specialist Grade	24.0%	
In-service Workshops	74.9%	
Networking	53.4%	
Opportunity for Collaboration	66.1%	
Parent Involvement		
Book Distribution	51.9%	
Family Literacy	23.7%	
Paired Reading (Parent-to-Child)	71.4%	
Parent Conferences	97.5%	
Parent Volunteers	66.1%	
Program Feature Factors		
Holistic Approaches	-.04	1.01
Explicit Approaches	.04	1.00
Small Group / Tutorial	-.08	.95
Child Centered / Expressive	.02	1.02
Ability Grouping	.01	.95
Pullout Instruction	.10	.98

Note: n=283.

[6] Percentages only are reported for dichotomous variables. Averages and standard deviations are reported when percentages are used as continuous variables.
[7] Schools in town and suburban locales were the reference group.
[8] Schools not receiving ELIGP funding were the reference group.

Third, more of the schools included in the sample had Reading Recovery (32.9%) than had OELI projects (17.7%) funded through ELIGP. OELI schools received larger grants, but served more students and, thus, had lower cost per student served (St. John, et al., 1998).

Fourth, the extent of professional development varied substantially for different types of professional development. About a quarter of the schools had certified training and certified specialists. Approximately three fourths of the schools had in-service workshops. Networking and collaboration were used in a majority of the schools in the sample (53 and 66%, respectively).

Fifth, there was also substantial variation in parent involvement strategies. Almost all schools had parent conferences. Paired (parent-child) reading or parent volunteers were also used in most schools. About half the schools had book distribution, a relatively high percentage that reflects the state's effort to improve early literacy. However, only about one quarter of the schools reported having family literacy programs.

Special Education Referral

When school characteristics were considered, only third grade reading scores had a direct association with special education referral rate (Table 4). Higher test scores were negatively associated with special education referral (i.e., the higher the average reading score, the lower the referral rate). In the second and third steps, there were slight changes in the significance level of this variable, but only one other variable had a statistically significant influence on referral rates. The type of funded program (Reading Recovery, OELI, or none) and professional development had no direct effects on special education referral, before the last model when instructional factors were considered.

Paired reading between parents and their children had a negative association with special education referral rates in both models in which it was included. This suggests that parents reading with children helps them to develop basic reading skills which limit special education referral. This relationship merits further study.

In the final model, two variables related to professional development and parent involvement were significant, along with two of the factor scores. First, funding through Reading Recovery was modestly significant (.1) and negatively associated with special education referral. This means that expanding Reading Recovery had a modest influence

TABLE 4
Standardized Coefficients of Predictors on Grade 1-3 Special Education Referral Rate

VARIABLES	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
School Characteristics										
ISTEP Reading Raw Score97	-.146*		-.139*		-.161**		-.135*		-.152*	
% Free or Reduced Lunch	.147		.168*		.139		.135		.071	
% Minority	.021		.008		.012		-.003		-.023	
Urban[9]	.021		.020		.032		.041		.048	
Rural[9]	-.055		-.063		-.058		-.053		-.083	
Funding Type										
OELI[10]			-.033		-.042		-.050		-.056	
RR[10]			-.065		-.084		-.086		-.108*	
Professional Development										
Certified Training					.083		.098		.112*	
Certified Specialist Grade					-.058		-.063		-.099	
In-service Workshops					-.009		-.002		.006	
Networking					.098		.103		.094	
Opportunity for Collaboration					-.017		.007		-.001	
Parent Involvement										
Book Distribution							-.056		-.073	
Family Literacy							-.004		-.021	
Paired Reading							-.108*		-.147**	
Parent Conferences							.027		.037	
Parent Volunteers							-.036		-.053	
Program Feature Factors										
Holistic Approaches									.204***	
Explicit Approaches									-.081	
Small Group / Tutorial									.018	
Child Centered / Expressive									.098	
Ability Grouping									.131**	
Pullout Instruction									.056	
Adjusted R^2	.076		.074		.074		.076		.125	

Note: n=283; * $p \leq .1$, ** $p \leq .05$, *** $p \leq .01$.

[9] Schools in town and suburban locales were the reference group.
[10] Schools not receiving ELIGP funding were the reference group.

on the reduction of special education referrals. The change in significance of this variable from step 1 to the final model indicates an interaction between the Reading Recovery program and the features of the early reading program. Second, certified trainers were slightly positively associated with referral (significant at .1). This feature was an integral part of Reading Recovery, also influence a reduction in special education referrals. Finally, paired reading, another feature of Reading Recovery, was also negatively associated with special education referral. The fact that these variables were significant in the final model means that there was a relationship between the program features and these variables.[11]

It is also interesting to note that the variables in steps 2, 3, and 4 do not improve the overall predictive capacity of the model. The R^2 is actually slightly smaller for steps 2 and 3 than for step 1 and the same for step 4 as for step 1. However, this does not mean that the variables included in these steps had no influence on referral rate. Indeed, in the final step, at least one variable in each set of variables was significant, indicating an interaction with the factors. Further, the R^2 increased substantially in the final step.

Two of the factors in the final model were significant and positively associated with special education referral, indicating that they actually predict an increase in referral. Specifically, the reported use of holistic instruction, which includes active performance of a reading or language arts skill and systematic evaluation, was positively associated with special education referral. This finding indicates that using holistic approaches that emphasize cooperative learning and formative assessment are negatively associated with special education referral. It is possible that the active performance and assessment of students enables teachers to identify earlier those students having difficulties with reading. In addition, perhaps programs that emphasize these methods rely on specialists to provide more directed, systematic instruction.

In addition, ability grouping was also positively associated with special education referral. The use of ability groups may impose a structure on the classroom environment that makes it difficult to adapt the classroom to meet the needs of the lowest achievers.

[11] This set of relationships between predictor variables merits further study. Future studies should consider these relationships through structural equation models.

Students who do not "fit" into the lowest of hierarchical ability groups may be then referred for special education assessment.

These findings also have interesting implications for Reading Recovery. On one hand, this analysis provides modest evidence to support the claim that Reading Recovery influences a reduction in special education referral. At the same time, some of the systematic features of reading programs, including features that are integral to Reading Recovery, were positively associated with referral rates. Perhaps because of its systematic features, including the routine assessment of all children, schools with Reading Recovery were more likely to identify children with special needs, but more importantly were also more likely to meet the needs of these students without special education referrals.

Retention in Grade Level

A very different pattern was evident in the analysis of retention in grade level (Table 5). In the first step, two variables related to school characteristics were significant and positively associated with retention. Schools with higher percentages of students from poor families and larger percentages of minority students were more likely to have high retention rates. These variables were significant across all five steps in the regression analysis, indicating a strong positive association. These findings are consistent with many studies that indicate poor and minority children have greater difficulty learning to read (Snow, et al., 1998) and are more likely to be retained.

In the second step, OELI funding was negatively associated with retention, indicating that OELI projects had a negative influence on retention. This reinforces the finding noted above that OELI funding (mostly classwide projects) went to schools with higher test scores. In addition, reading scores were modestly significant and positively associated with retention in the second step, indicating a slight interaction between reading achievement and OELI funding.

In the third step, one variable related to professional development was significant. Schools that provided an opportunity for collaboration among teachers were more likely to have lower retention rates. This reinforces claims that when teachers are able to communicate and collaborate with each other, they are more likely to design strategies that adapt to the learning needs of students (Lewison, 1999; St. John & Bardzell, 1999).

TABLE 5
Standardized Coefficients of Predictors on Grade 1-3 Retention Rate

VARIABLES	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
School Characteristics										
ISTEP Reading Raw Score97	.105		.127*		.142*		.154**		.156**	
% Free or Reduced Lunch	.220**		.256***		.281***		.314***		.346***	
% Minority	.268***		.252***		.281***		.262***		.268***	
Urban[12]	-.015		-.019		-.035		-.022		-.030	
Rural[12]	.079		.063		.075		.082		.120**	
Funding Type										
OELI[13]			-.113*		-.101*		-.093		-.056	
RR[13]			-.062		-.024		-.015		.026	
Professional Development										
Certified Training					-.053		-.079		-.062	
Certified Specialist Grade					-.045		-.051		-.035	
In-service Workshops					.014		.008		.040	
Networking					-.018		-.010		-.042	
Opportunity for Collaboration					-.154**		-.155**		-.138**	
Parent Involvement										
Book Distribution							.052		.090	
Family Literacy							-.121**		-.104*	
Paired Reading							-.144**		-.116*	
Parent Conferences							.043		.017	
Parent Volunteers							.069		.093	
Program Feature Factors										
Holistic Approaches									-.181***	
Explicit Approaches									.133**	
Small Group / Tutorial									-.136**	
Child Centered / Expressive									-.053	
Ability Grouping									-.051	
Pullout Instruction									.008	
Adjusted R^2	.123		.130		.143		.171		.213	

Note: n=283; * $p \leq .1$, ** $p \leq .05$, *** $p \leq .01$.

[12] Schools in town and suburban locales were the reference group.
[13] Schools not receiving ELIGP funding were the reference group.

It is also interesting to note the strength of the association between OELI funding and retention was weaker, indicating that OELI projects had more opportunity for collaboration among teachers.

In the fourth step, two variables related to parent involvement were significant and negatively associated with retention. Schools with family literacy programs and those that encouraged paired reading between parents and children had lower retention rates. This finding supports claims that parent involvement improved early reading. In addition, it is interesting to note that OELI funding was no longer significant, indicating that a part of the reason for the significance of the variable in earlier models was attributable to the fact that OELI funded schools had more parent involvement in early reading.

In the final step, three of the factors were statistically significant. Having holistic approaches and using small groups were negatively associated with retention, meaning that these practices predict improved learning opportunities for children at risk of being retained. It appears that holistic approaches to literacy instruction provided supportive classroom environments that adapted to the needs of children in at risk situations. In contrast, schools that emphasized explicit approaches had higher retention rates. This means that an emphasis on structured, context-free methods may create learning environments that do not allow for the instruction of students who are delayed in gaining literacy skills.

Further, in the final model, OELI funding was not significant in the last two steps of this analysis, thus further supporting a conclusion that this program had a direct influence on opportunity to collaborate and on parent involvement (i.e., family literacy and paired parent-child reading). Collaboration continued to have a significant, direct, and negative association with retention. However, the influence of parent involvement variables (paired reading and family literacy) had a weaker association than in the prior model.

In addition, being located in a rural setting was positively associated with retention in the final model, indicating an interaction with the curriculum. This suggests that some of the instructional and organizational features of early reading programs in rural schools interact with the curriculum. These interrelationships merit further study.

The percentage of minority and low-income students was positively associated with retention in each step. Given the relatively lower impact of test scores, these findings raise serious questions about whether schools are serving the learning needs of poor and minority children.

Conclusions

Several conclusions related to the ways in which special education referrals and grade retention are influenced by school reform can be drawn from this study. First, using a comprehensive and systematic approach to evaluation provides greater insights into the effects of reforms. This study developed and tested a model that examined the impact of school characteristics, the type of program funding, the type of professional development provided, the types of parent involvement used, and the features of the early reading program on educational outcomes. This approach to assessing the effects of special state funding for reading improvement proved a workable approach to untangling the complex ways that public funding influences the opportunity for children to learn to read.

Second, different types of reading interventions have different types of effects. Reading Recovery improves the capacity of schools both to identify and to serve children with special needs. However, these effects are offsetting, which helps explain why Reading Recovery does not have a significant association with reading outcomes when examined before the features of the program were controlled for. This provides reason to question the conclusions by the National Research Council (Snow, et al., 1998) about the inefficacy of Reading Recovery. Indeed, it appears that Reading Recovery both identifies more children's reading problems and helps service some of these children. However, it is also clear that every child served by Reading Recovery would not end up back in the same grade level or in special education, as advocates for Reading Recovery claim (e.g., Lyons, 1994; Lyons & Beaver, 1995).

In contrast, schoolwide and classwide interventions can improve the way the system as a whole works and provide more opportunities for children to learn to read, as evidenced by reduction in retention rates. However, these programs had an influence on retention through parent involvement and instructional processes. Indeed, these reforms helped reduce retention rates because they created opportunities for parent involvement.

Third, program features related to early reading influence different educational outcomes in different ways. For example, holistic approaches increase special education referral but decrease grade level retention. In contrast, explicit approaches increase retention in grade level but do not have a significant influence on special education referral. Thus, it may be overly simplistic to claim any particular methods or interventions improve all reading related outcomes. For example, this study does not support claims that Reading Recovery saves money for each child in the program because it offsets high costs of returning students or providing special education services (e.g., Lyons, 1994; Lyons & Beaver, 1995). However, it does illustrate how the features associated with Reading Recovery facilitate the identification of students with special learning needs and the service of those students. Given this complex set of interactions, it is unlikely that implementing Reading Recovery on a large scale will change short-term educational outcomes, but it could give a small number of children a better foundation for learning.

Fourth, professional development appears to have both direct and indirect influences on reading improvement. The sequential regression analyses of special education referral revealed that having certified training in schools interacted with other program features in schools to influence special education referral. In contrast, the opportunity to collaborate had a consistent direct effect on reducing retention in grade level.

Finally, the specific features included in reading and literacy programs have substantial and direct influence on educational outcomes. Four of the six factors related to early reading instruction and organization had a direct influence on these opportunity-related outcomes. Having a holistic approach predicted both a reduction in the retention in grade level and an increase in special education referral. Making more extensive use of ability groups was also related to special education referral. Using more small groups was negatively associated with grade level retention, while explicit approaches were positively associated with higher retention. This means that not only did educational practices influence learning outcomes in complex ways, but that different practices have different effects.

References

Cunningham, P. (1991). Research directions: Multi-method, multilevel, literacy instruction in first grade. *Language Arts, 68*, 578-584.

Cunningham, P., Hall, D., & Defee, M. (1991). Non-ability-grouped, multilevel instruction: A year in a first-grade classroom. *The Reading Teacher, 44*(8), 566-571.

Flint, A. (1999). Reader's and Writer's Workshops. In E.P. St. John & J.S. Bardzell, *Improving Early Reading and Literacy: A Guide for Developing Research-Based Programs*. Bloomington, IN: Indiana Education Policy Center.

Fullan, M. (2000). The three stones of educational reform. *Phi Delta Kappan, 81*, 581-585.

Hopfenberg, H., Levin, H. M., & Associates. (1993). *The Accelerated Schools*. San Francisco: Jossey-Bass.

Lewison, M. (1999). Teacher inquiry. In E.P. St. John & J.S. Bardzell, *Improving Early Reading and Literacy: A Guide for Developing Research-Based Programs*. Bloomington, IN: Indiana Education Policy Center.

Lyons, C. A. (1994). Reading Recovery and learning disability: Issues, challenges, and implications. *Literacy, Teaching, and Learning, 1*(1), 109-119.

Lyons, C. A., & Beaver, J. (1995). Reducing retention and learning disability placement through Reading Recovery: An educationally sound, cost-effective choice. In R. L. Allington & S. A. Walmsley (Eds.), *No quick fix* (pp. 116-136). New York: Teachers College Press.

Ohio State University. (1998). Literacy Collaborative. (Information packet on Literacy Collaborative provided by program directors). Columbus, OH: Author.

Pinnell, G., Lyons, C., DeFord, D., Byrk, A., & Seltzer, M. (1994). Comparing instructional models for the literacy education of high-risk first graders. *Reading Research Quarterly, 29*(1), 9-39.

Ross, S., & Smith, L. (1994). Effects of the Success For All model on kindergarten through second-grade reading achievement, teacher's adjustment, and classroom-school climate at an inner city school. *The Elementary School Journal, 95*(2), 121-138.

St. John, E. P., & Bardzell, J. S. (1999). *Improving Early Reading and Literacy: A Guide for Developing Research-Based Programs.* Bloomington, IN: Indiana Education Policy Center.

St. John, E. P., Bardzell, J., Michael, R., Hall, G, Manoil, K., Asker, E. & Clements, M. (1998). *Indiana's Early Literacy Intervention Grant Program Implementation Study.* Bloomington, IN: Indiana Education Policy Center.

St. John, E. P., Manset, G., & Michael, R. (1999). Early Literacy Intervention Survey. In E.P. St. John & J.S. Bardzell, *Improving early reading and literacy: A guide for developing research-based programs.* Bloomington, IN: Indiana Education Policy Center (see online documents at http://www.indiana.edu/~ipec/).

St. John, E. P., Ward, J. G., & Laine, S. W. M. (1999). *State policy on professional development: Returning the linkage to student outcomes.* Oak Brook, IL: North Central Regional Educational Laboratory.

Slavin, R. (1996). *Education for all: Contexts of learning.* Lisse, Netherlands: Swets & Zeitlinger.

Slavin, R., Madden, N., Dolan, L., Wasik, B., Ross, S., & Smith, L. (1994). Whenever and wherever we choose: The replication of 'Success For All.' *Phi Delta Kappan, 75*(8), 639-647.

Slavin, R., Madden, N., Karweit, N., Dolan, L., & Wasik, B. (1990). *Success for All: Effects of variations in duration and resources of a school-wide elementary restructuring program* (Report No 2). Baltimore, MD: Johns Hopkins University, Center for Research on Effective Schooling for Disadvantaged Students.

Slavin, R. E., & Yampolsky, R. (1991). *Success for All: Effects on language minority students* (Report No. 14). Baltimore, MD: Johns Hopkins University, Center for Research on Effective Schooling for Disadvantaged Students.

Snow, C., Burns, M., & Griffin, P. (1998). *Preventing reading difficulties in young children.* Washington, D.C.: National Academy Press.

Tuman, M. (1987). A preface to literacy: *An inquiry into pedagogy, practice, and progress.* Tuscaloosa: The University of Alabama Press.

U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994, NAEP Reading, Revised Edition: A First

Look prepared by Educational Testing Service. Washington, D.C.: U.S. Government Printing.

Wilson, J. (1986). The properties, purposes, and promotion of literacy. In S. de Castell, A. Luke, & K. Egan (Eds.), *Literacy, society, and schooling: A reader* (pp. 27-36). Cambridge, U.K.: Cambridge University Press.